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a cross-media typographic framework: teaching typographic skills in a convergent media

Joyce S.R. Yee

Typography has a specific purpose; of so arranging letters, distributing the space and controlling the type as to aid to the maximum the readers' comprehension of the text.

Stanley Morison¹

Unlike book typography, this new screen typography dances; it sings; it shouts; it does somersaults and cartwheels, and then, when it settles down, just as you think you have got a hold on it, you mouse over a word and it transforms instantly into something completely different.

Jessica Helfand²

the changing face of typography

These two contrary statements highlight the growing gulf between print and screen-based typographic application. Typography has evolved from an environment that is mechanical, static and communication focused to one that is digital, dynamic and experienced focused. Yet we still use print-derived terminology (such as x-height, counter, baseline, descender, ascender, kerning, leading, tracking, em, en, pica and points) to continually describe screen-based typography. This is unsurprising, considering that we still continue to think, write and read using a print model.³ As the gulf between print and screen expands, our ability to reconcile these differences using an out-dated model becomes increasingly difficult. It is no longer sufficient to continually adapt our print model for screen. Instead, it requires a complete review of how we approach, view and apply typographic knowledge.

Typography is a constantly evolving subject, governed by the changing usages of language, medium and technology, making it difficult to formalize its knowledge. As John Kane succinctly puts it, "the pedagogic difficulty is that type has a system of principles, based on experience, and those principles keep evolving as language and media evolve".⁴ Unfortunately, remarkably little has changed from the 1960s model of typographic instruction, where formal principles are emphasized rather than contextual understanding.⁵ Due to changes in inscription technologies, specifically recording and synthesizing technologies, there is an increasing disconnect between how typographic knowledge is being presented to students and how students are asked to apply this knowledge across a different range of media.⁶

purpose and value of the framework

How do we reconnect existing theoretical knowledge of typography with changing design applications across media? Exploration of this question resulted in a PhD research programme undertaken from 2002 to 2006 at Northumbria University. This research resulted in the devel-

1. Morison, S., *First principles of typography*, 2nd ed., Cambridge, 1951.

2. Helfand, J., *Screen*, NY, 2001.

3. Chartier, R., *Forms and meanings*, Pennsylvania, 1995.

4. Kane, J., *A type primer*, London, 2002, p.viii.

5. Swann, C., "Typography is too important to be taught to designers", in Jury, D., (ed.), *Typographic writing*, London, 2001, pp.266-269. Heller, S., *Fashion follows function*, London, 1995. Poyner, R., "Interview with Katherine McCoy", *Eye*, 4, (16), 1995, pp.10-16.

6. According to Kress and Leeuwen recording technologies are those which automate analogical representations, for example audio recording, film and photography. Synthesizing technologies are those based on digital representations using a technological interface, for example the use of computer software and digital devices like the mouse and keyboard. Kress, G.R. Leeuwen, T. V., *Reading images. The grammar of visual design*, NY, 1996.

opment of a pedagogic framework that offers a new approach, structure and content for the teaching, understanding and application of typography in cross-media communication environments. The purpose of this framework is to provide guidance to graphic and multimedia design educators in the planning and delivery of typographic knowledge across different media. It achieves this in two ways; firstly by identifying transferable global typographic skills to enable relevant translation of print-derived knowledge into other media, and secondly by introducing specialist design knowledge applicable to screen-based media. As a result, the framework consists of two distinct areas of knowledge: Global Skills and Specialist Skills.

This paper will concentrate on introducing and describing the framework's development, structure and content. Due to space limitation, the practicalities of using the framework will be touched upon but will not be discussed at length. This framework has been developed and tested within a single educational environment. As a result, the research was unable to draw any conclusive conclusion into how different pedagogic models influence the effectiveness of the framework. Audiences are urged to treat the framework as a 'work-in-progress' model that can be refined through additional field-testing in other educational environments.

development of the framework

Kalantzis and Cope identify three levels of learning theory: pedagogy, curriculum and education. [Fig.1] Pedagogy is the "HOW of formal learning. The way that learning activities are selected and designed and experienced in any learning encounter... Curriculum is the WHAT of formal learning. Subject choices, content material, discipline fields and orientation to knowledge... Education is the WHY of formal learning. The goals and expectations of range of stakeholders, for example, learner, teacher, school, community district, government and so on".⁷

Research undertaken through this PhD study has revealed the need to update and reframe typographic content in relation to the changes

7. Kalantzis, M., Cope, B., *The learning by design guide*, 4th ed., Altona, 2006, p.9.

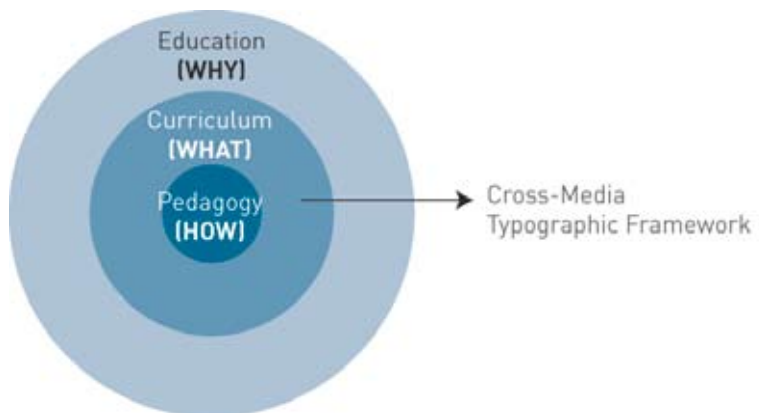


Figure 1. Illustrating where the cross-media typographic framework fits with the three levels of learning theory.

in media technology. As a result, the framework developed has a strong focus on the Curriculum level, at the 'WHAT' of typographic learning (see fig.1). Specifically, it aims to provide a more comprehensive and integrated source of information that reflects the growing influence of screen-based media and presents typographic concepts relevant for a cross-media context.

This framework has been refined through the PhD research programme by actual applications with students and further validated by educational and practice-based professionals in peer-review sessions. It has since gone through several revisions and recently, has been used by the author to structure knowledge delivery within a cross-media typographic project. Through real-live applications, some aspects of the pedagogy (or the HOW of learning) are slowly emerging. Future development of the framework will focus more on the 'HOW' of learning, where the micro designs of learning activities and how they are delivered will be developed.

framework qualities

The study has identified six key qualities that the new framework should reflect. These qualities are best described by contrasting them with the current framework in Table 1.

Table 1. A comparison between the new and current framework qualities.

Cross-media Typographic Framework	Print-derived Typographic Framework
① Integrated model of knowledge	Separation model of knowledge
② Cross-media skills	Print medium skills
③ Cross-disciplinary knowledge	Subject specific knowledge
④ Communication focused	Form focused
⑤ Principles developed to ensure flexibility and appropriateness	Principles developed to ensure predictability
⑥ Principles developed for a changeable media	Principles developed for a stable medium

1. integrated model of knowledge

Digital media have enabled the simultaneous convergence and divergence of different technologies and forms of communication. Convergence can occur at both the levels of production and distribution.⁸ In terms of production, newspaper, television and radio may have very different production methods but can now all be created using a networked multimedia computer. Similarly, the distribution of these different content can now be converged into a single stream of delivery through an online network. At the same time, newer delivery platforms are diverging and adding to the current forms.⁹ As a result, learning and practising design within a single communication medium is no

8. Lister, M., Dovey, J., Giddings, S., Iain, G., Kieran, K., *New media: A critical introduction*, London, 2003.

9. Rogers, E., *Communication technology: The new media in society*, NY, 1986.

longer feasible. This is the age of multi-modal communication, where messages are being delivered through not one but a multitude of media channels. Therefore, the framework focuses on transferable skills that are applicable across a broad spectrum of delivery channels. The current model of media separation should be integrated to reflect the current convergence of delivery streams, and at the same time address the divergent forms of media by introducing relevant medium-specific content.

2. cross-media skills

The proliferation of new digital media such as the World Wide Web, interactive television and mobile phones as alternative delivery channels, highlights the importance of transferable cross-media skills. These skills extend to the application of typographic principles across media. An evaluation of current skills was used to realign existing typographic knowledge with different digital media technology and characteristics.

3. cross-disciplinary knowledge

In the past few years, there have been a growing number of designers and typographers advocating a more cross-disciplinary approach towards the subject of typography in light of new educational and technological challenges.¹⁰ David Jury insightfully pointed out that "the study of typography cannot (and more and more is not) confined to any one special branch of learning".¹¹ The introduction of new media has introduced new concepts such as "digitality, interactivity, hypertext, dispersal, virtuality and cyberspace".¹² Understanding these concepts and their implications for typography would require a review of its existing principles, and deriving new strategies from external disciplines in order to develop new cross-disciplinary knowledge.

4. communication focused

Typography is a complex subject. Understanding it requires a range of activities such as the development of an aesthetic sense, analytical skills and attention to detail; a focus on historical and technical knowledge and most importantly, an understanding of the way language is used. Typographic education has mainly focused on the aesthetic qualities of typographic forms and the technical proficiency required to achieve it. As Martens notes, the function of a typographer is often considered to be a 'form-giver', representing the visual form of language. In comparison, a communication-focused perspective places the understanding of the design objective as a primary concern that will inform the selection of an appropriate typographic strategy.¹³ Although these two perspectives (form and communication) have existed side by side, there has always been an emphasis on formal and technical issues rather than communication purposes (probably due to the continued influence of the Modernist and Swiss schools).

Focusing on the aesthetic output at the start of a project where

10. Swann, C., "Typography is too important to be taught to designers", *Curtin School of Design Journal*, no.4, 1997. Swanson, G., "Graphic design education as a liberal art: Design and knowledge in the university and the real world", in Heller, S., (ed.), *The education of a graphic designer*, NY, 1998, pp.13-24.

11. Jury, D., *About face: Reviving the rules of typography*, Mies, 2002, p.152.

12. Lister, et al, *New media*, p.13.

13. Martens, K., *Printed matter/drukwerk*, London, 1996, p.129.

design decisions are still being formed often teaches students to apply typographic rules without understanding the communication objectives that have shaped them. Jury warns that "if form loses contact with the message, it will degenerate into novelty".¹⁴ The introduction of cross-media delivery channels has made a form-focused perspective more difficult to adapt. Aesthetic values of different media will always be difficult to reconcile, whereas communication objectives of a particular design are analogous across media.

5. principles developed to ensure flexibility and appropriateness

Compared with other design skills and disciplines, typography is most often talked about as a 'black art'.¹⁵ It is, as Jury says, "an activity founded on empiricism [sic] and, to the outsider, shrouded in secrecy".¹⁶ The myth of the 'black art' is further perpetuated by 'rules' disguised as styles of typographic practice, as advocated by past typographers such as Stanley Morison, Eric Gill and Jan Tschichold.¹⁷ Traditional typographic education has generally been focused on conveying archaic typographic conventions rather than encouraging engagement with the concepts that have led to these conventions. The alternate contextual approach is akin to Erik Spiekermann's belief that the different features of text typography are all interrelated, and that 'rules' about typography are not immutably fixed, but depend upon the situation.¹⁸

6. principles developed for a changeable media

Principles, often considered as rules, are present to ensure conventionality and predictability.¹⁹ This predictability is crucial in delivering information to readers to ensure the highest possible comprehension. However, most rules were derived with the assumption that the delivery media would be stable and familiar to readers. In contrast, the technology and content of screen-based media changes at a phenomenal rate (for example the trend cycles of social networking websites, such as MySpace and Facebook). Landow suggests that this transition will take longer than anticipated (hundreds of years rather than decades) and as a result will require an approach that allows for these uncertainties by developing adaptable strategies, capable of evolving in response to the development of the media.²⁰

framework overview

These six qualities have given shape to the structure and content of the framework as well as the strategy for its application. Their relationship can best be illustrated through figure 2.

The framework consists of two key components: *Global Skills* and *Specialist Skills*. Global Skills contains theories and principles derived from historical and practice-based sources. It is a set of core concepts and skills (grouped in an historical, technological and application context), which are global in their applicability. The Global Skills represents four communication functions of typography: Form, Content, Express-

14. Jury, D., "Convention and creativity in typography", in Heller, S., (ed.), *The education of a typographer*, NY, 2004, p.106.

15. Kinross, R., *Modern typography: An essay in critical history*. London, 1992.

16. Jury, *About face*, p.6.

17. Morison, *First principles*. Gill, E., *An essay on typography*, 2nd ed., London, 1936. Tschichold, J., *Die neue typographie*, Facsimile ed., Berlin, 1928.

18. Spiekermann, E., Ginger, E.M., *Stop stealing sheep and find out how type works*, California, 1993.

19. Jury, "Convention and creativity", p.101.

20. Landow, G.P., *Hypertext 2.0*, London, 1997.

CROSS-MEDIA TYPOGRAPHIC FRAMEWORK



Figure 2. Cross-media typographic framework.

sion and Context. Each category highlights different sets of skills and knowledge related to each specific communication function. They contain methods to evaluate, describe and analyse typographic application within the larger context of a designed artefact. This approach aimed to instil the idea of transferable skills in different contexts, and to provide students with a conceptual model of the relationship between the different aspects of typographic usage.

The second component, Specialist Skills, consists of a set of medium-specific skills developed for application in different media. While Global Skills are fixed and predefined, Specialist Skills are influenced by contextual factors such as media technology, socio-political and economic factors. Evaluation of these factors has led to the identification of four areas of medium-specific knowledge: Hyper-textuality, Interactivity, Temporality and Usability. Hyper-textuality refers to the concept of linking media elements, such as text, images and animation across a network. Interactivity refers to the ability of users to select, change or customise media elements that they access. Temporality refers to the passage of time through virtual environments. This concept can be discussed under two main themes: animation and dynamic content. Animated or kinetic typography is the most progressive area of screen-based typography and owes its development to the film medium. Dynamic content refers to the shift in design emphasis, from that of designing form to that of designing specifications. This shift facilitates the increasing ephemeral nature of screen-based content such as web

blogs and social networking sites where content changes on a regular basis. The issue of usability has become more pertinent with the introduction of different rendering and imaging technology. Additionally, specific guidelines relating to accessibility issue must become more prominent in typographic education.

Further contextual factors which are related more to the pedagogy of 'How' students learn are divided into educational and professional practice.²¹ These factors were included into the final framework to illustrate the relationship between the framework and key elements of each practice. While some of these factors are particular to one practice (such as teaching and learning styles), other factors such as an individual's design skills or a project brief are influencing factors for both practices. This paper will focus mainly on the first two components: Global and Specialist Skills.

global skills matrix

The Global Skills category consists of four typographic functions which are further divided into three knowledge groups. The relationship between the Typographic Functions and the Knowledge Categories is illustrated in figures 3 and 4. Figure 3 provides a verbal summary, while figure 4 provides visual examples summarising the relationship between the three knowledge categories with the four typographic functions. Detail descriptions of each area are located in the following sections.

21. Kalantzis, Cope, *The learning by design guide*.

Figure 3. Knowledge matrix summary.

	FORM	CONTENT	EXPRESSION	CONTEXT
Historical, Social & Cultural	Knowledge derived from the historical, social and cultural development of the letterform. It traces factors that have contributed to the development of typographic visual attributes.	Knowledge derived from the historical, social and cultural development of various forms of written and spoken communication and its variety of media outputs.	Knowledge derived from the historical, social and cultural development of meaning creation through typographic methods.	Knowledge derived from the historical, social and cultural development of contextual issues affecting typography.
Technology & Method	Knowledge derived from the practical application of letterform creation.	Knowledge derived from the practical application of text composition and arrangement.	Knowledge derived from the practical application of meaning creation through typographic methods.	Knowledge derived from the practical application of various creation and delivery technologies.
Analysis & Application	Knowledge derived from critical evaluations of typographic form application.	Knowledge derived from critical evaluations of typographic content application.	Knowledge derived from critical evaluations of meaning creation through typographic methods.	Knowledge derived from critical evaluations relating to the external and internal factors affecting typographic practice.



Figure 4. Knowledge matrix visual summary.

22. Oxman, R., "Think-maps: Teaching design thinking in design education", *Design Studies*, 25, no.1, 2004, pp.63-91.

typographic functions

The Global Skills component of the framework is built around four communication functions of typography. Each category highlights different sets of skills and knowledge related to each specific communication function. They consist of methods to evaluate, describe and analyse typographic application within the larger context of a designed artefact.

It must be stressed at this point that these intents are not mutually exclusive to each other, and their subject matters often overlap. However, this research suggests that using a grouping based on typographic communication intent rather than on technology-based typographic principles will provide a more relevant framework for a cross-media environment. According to Oxman, if knowledge is structured and coded in a way that is easily understandable and accessible, it is more likely to be used.²² Discussing and delivering typographical knowledge using this framework will in theory allow learners to understand typographic principles more effectively, and apply typography confidently across media. These four classifications are defined as:

- ▶ Typographic form
- ▶ Typographic content
- ▶ Typographic expression
- ▶ Typographic context

typographic form

This classification refers to the visual appearance and aesthetic quality of letterforms and type. The principles and skills in this category refer to

the understanding, description and creation of different visual configurations of letterforms. Discussion in this category would revolve around the:

- ▮ Anatomy of individual letterforms and multiple units of letterforms.
- ▮ Formal attributes of individual letterforms and typeface families (relating to typeface classification).
- ▮ Aesthetic quality of type, ranging from individual letterforms to word, sentence and paragraph units.
- ▮ Terminology used to describe these aspects of typographic form.
- ▮ Principles and strategies used to generate the required form.

typographic content

This classification refers to the various ways type is used for different delivery media and content genres. The principles and skills in this category refer to the understanding, description and creation of textual content. Discussion in this category would revolve around the:

- ▮ Characteristics, formal attributes and purposes of textual configurations, such as informative, instructive and narrative text.
- ▮ Characteristics, formal attributes and purposes of various analogue and digital media such as the book, newspaper, leaflet, brochure, poster, magazine, web page, signage, interactive TV, film, mobile phones, PDA, teletext, etc.
- ▮ Characteristics, formal attributes and purposes of the ideographic units of typography such as punctuation, parenthesis, colon, full-stop, brackets, question marks, exclamation mark, indentation etc.

typographic expression

This classification refers to how typography is used to generate and communicate phonetic and ideographic meanings. The principles and skills in this category refer to the understanding, description and creation of meaningful and expressive forms of typographic content. Discussion in this category would revolve around:

- ▮ The historical, cultural, social and political association of typefaces and typographic styles.
- ▮ The stylistic association of typefaces and typographic style.
- ▮ The visual association of typefaces and typographic style.
- ▮ The usage of phonetic and ideographic symbols to generate meaning (either through the usage of phonetic spellings of spoken accents such as those employed in Irvine Welsh's novel, *Trainspotting* (1993), or the use of punctuation to represent pitch, volume or stress).
- ▮ Understanding the process of interpretation by its audiences.

typographic context

This classification refers to the internal and external context in which typography functions. The principles and skills in this category refer to the relationship between readers' interpretations of the communication brief, and the design solution. Discussion in this category would revolve around the:

- Understanding of how audiences are interpreting the message.
- Understanding and translation of the communication brief into a typographic-led design concept.
- Selection and manipulation of the appropriate technology to transmit the message.
- Selection and manipulation of the appropriate medium to transmit the message.
- Usage of typography in relation to other design elements such as images, colours, sound, animation etc.

Each category is further divided into three knowledge groups:

- (i) historical, social and cultural issues,
- (ii) technology and method and
- (iii) analysis and application (see figs 3 & 4).

Tables 2-4 provide a sample list of each groups' contents. Content for each category is not exclusive, and in some instances, does overlap. This expanded list is not only meant to be used as a guide but more importantly, to be used as a manifestation of the framework's qualities. As such, the content is expected to evolve and change accordingly when the framework is developed further.

typographic knowledge categories

Historical, social and cultural issues [Table 2]

Knowledge grouped in this category concerns the record of knowledge generated by past events specific to the subject of typography. This includes the development of the letterform, writing systems, communication media, typeface classifications and the social impact of the written word. Historical, social and cultural factors are considered in the development and discussion of typographic practice.

Table 2. Typographic knowledge category 1: Historical, social and cultural issues.

Historical, Social and Cultural Issues	FORM		CONTENT		EXPRESSION		CONTEXT	
	Categories	Examples	Categories	Examples	Categories	Examples	Categories	Examples
	Phonetic Symbols	Roman alphabet, numerals, mathematical symbols	Ideographic symbols	Punctuations (e.g. exclamation mark, punctuation, parenthesis, brackets, colon, semi-colon, period)	Historical associations	Blackletter (German), Art Nouveau (French), Old English (English)	Technology and media theories	Technological determinism, looking at the effects of the printing press and digital media, new media theories
	Typeface classification and description	Historical models (e.g. VOX, British Standard 2961) or descriptive models	Function of text	Instructional, informational, recreational, promotional, experiential, marketing	Stylistic associations	Script (elegance), san serif (modern), handwritten (personal)	Communication theories	Structuralist theories, Post-structuralist theories
			Forms of text	Poetry, drama, essays, prose	Visual associations	Thin/light (soft), heavy (shout, important), condensed (tight), extended (large, spacious)		
			Delivery channels (2D, 3D & 4D)	Scroll, illuminated manuscript, codex, poster, leaflet, signage	Language	Written (e.g. punctuation) and spoken (e.g. pitch, volume, stress, pause, accent, rhythm)		

technology and method [Table 3]

This category addresses the processes, skills, techniques and technologies used in the application of typography. This includes principles, theories and best practice methods generated through collective experiences and agreed upon by the typographic community.

Technology & Method	FORM		CONTENT		EXPRESSION		CONTEXT	
	Categories	Examples	Categories	Examples	Categories	Examples	Categories	Examples
	Proportion	Measurement units, x-height, type sizes, counter, ascender, descender, letter and word spacing, width, cap height	Proportion (text)	Type size, letter spacing, word spacing, line height and length	Methods of expression	Typeface styling, family, style, weight, width, size, colour, decoration, ornaments, placement, emphasis, word-association, sound, movement	Content analysis	Type and purpose of content, for e.g. instructional content to instruct and navigate
	Hierarchy & emphasis	Type size, type style, letterform width, weight, colour, alphabetic symbols	Proportion (medium)	Aspect ratio, grid, column, golden section	Types of expression	Emotion, concept, object, intent, audio	Stakeholder profile	Types of stakeholders, relationship to product, motives
	Clarity	Letter shape, characters spacing, contrast, counter space, character recognition, colour, special characteristics	Orientation & navigation	Content mapping, sequence, cross-referencing, section indicator, placement, index, consistency	Associations	Historical, cultural, personal, stylistic, conceptual	Context of use	User profiles or personas, purpose of use, environmental profile
	Contrast & Unity	Family, style, terminations, weight, width, stroke, stress, key characters, decoration, ornaments, ligatures, colour, positive, and negative spaces	Hierarchy & emphasis	Scale, grouping, placement, colour, headlines, sub-headlines, captions, proximity, alphabetic symbols, diacritical marks			Technology – origin and creation	Hand punch cutting and composition, mechanical, composition, phototypesetting, digital
			Contrast & unity	Typeface, paragraph and medium styling			Technology output	Physical and soft media
			Balance	Symmetry and asymmetry			Methods of delivery	2D, 3D and 4D media
			Clarity	Line lengths, kerning, leading, size, typeface, positive and negative spaces, colour, contrast, bouma shapes, cases, medium				
			Texture	Type family, size, style, weight, width, x-height, line height				

Table 3. Typographic knowledge category 2: Technology and method.

analysis and application [Table 4]

This category identifies past and current examples of typographic application and analyses how typography has been applied in relation to the communication purpose. This includes discussions on the mode of use, examples of application and considerations on its appropriateness.

specialist knowledge

The second component to the framework is the Specialist Skills. [Fig.5] In order for students to understand how to apply typography in screen-based media, they need to be aware of characteristics that are inherent in this media and the possibilities it offers. For clarity, these characteris-

	FORM		CONTENT		EXPRESSION		CONTEXT	
Analysis & Application	Categories	Examples	Categories	Examples	Categories	Examples	Categories	Examples
Types of application	Non-representational forms	Shape and pattern creation	Textual Display	Book, newspaper, leaflet, poster, magazine, web page, teletext	Emotional expression	Movie titles and credits, kinetic typography	Narrative creation	Closed, open, sequential, non-sequential, single author, collaborative
	Representational forms	Image creation	Spatial Information Display	Transport map, timetable, financial statement, chart	Analogical expression	Enforcing textual meaning for example in visual poetry, concrete poetry	Narrative presentation	Visual poetry, word-play, visualising expressive sound
	Iconographic forms	Logotype, monograms, illuminated letters	Signage	Road, interior and exterior signage				
Analysis focus	Aesthetic factors	Balance, scale, colours, contrast, visual impact, texture, proportion	Clarity	Legibility, readability, language, visual hierarchy	Expressive qualities	Compare designed intent with possible interpretations	Medium application	Evaluate design intent with the choice and application of design
			Visual hierarchy	Contrast, scale, colour, typeface style and size	Meaning creation	How does the piece provide design cues to guide meaning creation?	Audience	Evaluate design intent for the targeted audience
							Related design materials	Suitability of design with other related designed materials – e.g. as part of the branding or product family's visual style

Table 4. Typographic knowledge category 3: Analysis and application.



Figure 5. Specialist Skills of the Typographic Framework.

tics are discussed under four areas: Hyper-textuality, Interactivity, Temporality and Usability.

1. hyper-textuality

This framework considers three applications of typography within a hypertext environment:

1. Narrative creation
2. Navigation device
3. annotation

Narrative in a printed document is generally thought of as sequential, its physical structure represented by a series of pages and top-to-bottom reading. With hypertext, text is represented by multiple entries and exit points in a virtual space. The designer has to be aware of the possible semantic relationships that exist between different units of text, and understand how to exploit associative linking offered by this medium. The possibilities of narrative creation through associative linking of text units have been explored mostly in the genre of hypertext fiction. Hypertext fiction such as Michael Joyce's *Afternoon Story* and Stuart Moulthrop's *Victory Garden* use a series of hyper-textual links to facilitate the creation of a narrative through links and navigation features within the story.²³ A feature of this system is the multidirectional and often labyrinthine linkages readers are invited or obliged to create.

Apart from narrative creation, hypertext is often used as a navigational device. However, the *Visual Thesaurus* application [Figs 6 & 7] manages to merge navigational functions with semantical representation to help users explore and understand language visually.²⁴ It is a dictionary and thesaurus with an intuitive interface that allows users to display information in different ways, and provide the option to view different linguistic relationships (such as synonyms and antonyms) between words.

Hypertext can also be used as a powerful annotation device to provide additional contextual information to a piece of content either through the usage of textual links or footnotes. Similarly, a hypertext

23. Joyce, M., *Afternoon: A story*, CD-ROM, 1987. Moulthrop, S., *Victory garden*, CD-ROM, 1998.

24. Thinkmap, *Visual thesaurus*, Available at: <http://www.visualthesarus.com>, 1998, Accessed 9 March 2005.

Figures 6 & 7. Screen shots of the *Visual Thesaurus* application.

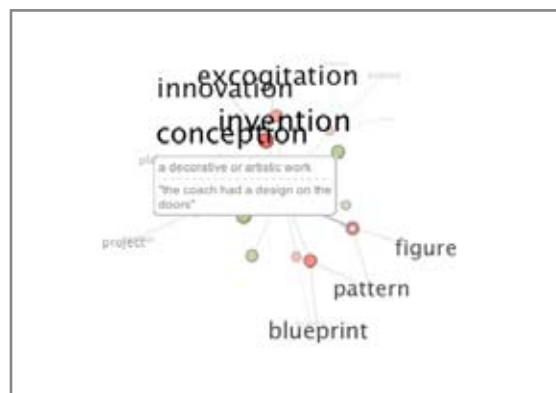
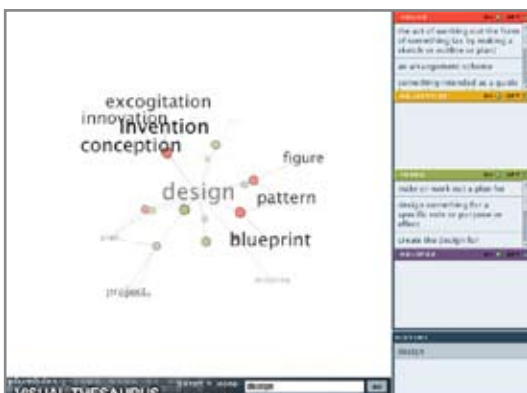
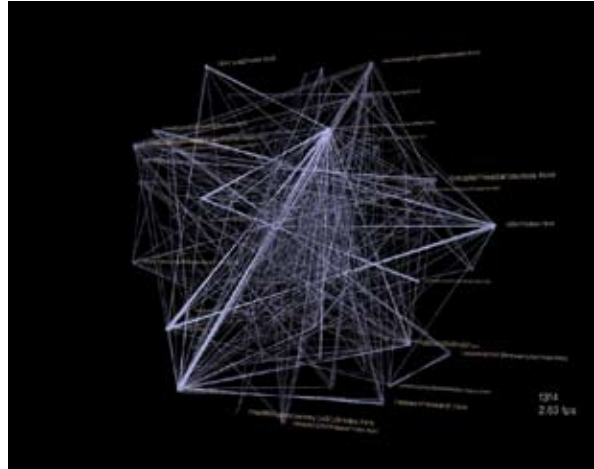


Figure 8. Screen shot of the *Valence* application.



application that generates visual mapping of textual relationship to represent complex information provides alternative ways in which to interpret and understand complex information. Examples of this type of application include Ben Fry's *Valence* application and Bradford Paley's *TextArc* project.²⁵ *Valence* [Fig.8] is "a set of software sketches about building representations that explore the structures and relationships inside very large sets of information" (Aesthetic and Computational Group, 1996).

2. interactivity

Interactive projects involving typographic content can be divided into two groups: content creation and meaning creation. *Content* creation projects reflect Shedroff's idea of 'productivity and creativity', where users are provided with opportunities to create, build and alter content in a site.²⁶ Some typographic examples (illustrated in figures 9 to 14) include the *Chinese Whisper* (Beaufonts) and the *Alphabet Synthesis Machine* (Levin et al) projects.²⁷ In the *Chinese Whisper* project, five original lowercase 'a's were offered as embryonic forms. Visitors could use them as a basis to create other letters in the alphabet by selecting different parameters in the site. The *Alphabet Synthesis Machine* goes one step further by allowing users to create a completely new alphabet using set parameters.

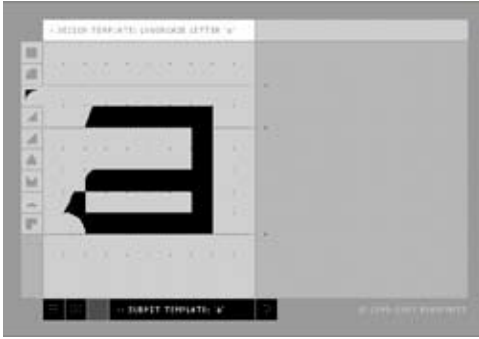
Meaning creation projects enable users to actively and continuously generate meaning from the content. For example, in Camille Utterback's interactive installation *Text Rain*, a user interacts with falling virtual letters on a screen. [Figs 13 & 14]²⁸ Users stand or move in front of a large projection screen, lifting and playing with the virtual letters. The letters are programmed to 'land' on anything darker than a certain tonal threshold. By using their body, users 'catch' words, and in some cases even a phrase.

25. Fry, B., *Valence*, Ver.1 [Online Application] Massachussets, 1999.
Paley, W.B., *Textarc*, Ver.1 [Online Application], 2002.

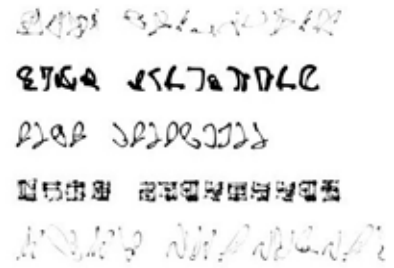
26. Shedroff, N., *Experience design 1*, Indiana, 2001.

27. Beaufonts, *Chinese whispers*, 2001, Available at: <http://www.beaufonts.com/pssst>, Accessed 22 December 2003. Levin, G., Feinberg, J., Curtis, C., *Alphabet synthesis machine*, 2002, Available at: <http://alphabet.tmemo.org>, Accessed 9 March 2005.

28. Utterback, C., Achituv, R., *Text rain*, Interactive installation, San Francisco, 1999.



Figures 9 & 10. Screen shots of Beaufont's *Chinese Whisper* Project.



Figures 11 & 12. Screen shots of the *Alphabet Synthesis Machine* Application.



Figures 13 & 14. Screen shots of *Text Rain* Interactive Installation.

The *Chinese Whisper* and the *Alphabet Synthesis Machine* projects mainly illustrate the technical and aesthetic (rather than meaning creation) possibilities of incorporating interactivity with elements of typography. In comparison, the *Text Rain* project not only provides rich user feedback, it also exploits the communicative possibilities when users attempt to read and make sense of the words, phrases and sentences falling from the top of the screen.

It was observed from the review of these projects that there was a distinct lack of typographic projects exploring meaning creations in interactive environments. Perhaps this is not surprising given that graphic designers are traditionally focused on meaning delivery rather than meaning creation. However, authorial power in a hyper-textual environment has become less defined and has altered the relationship between author, designer, reader and text. The traditional (non post-structuralist) reading and creation of meaning from a text makes assumptions about its stability and the fluidity of its interpretation. In contrast, text within an interactive environment is fluid and changing. For example, textual content in a community weblog is dependent on the interactions between the users. Designers are only able to design an empty vessel (in this case a design template) that will be populated with user content. In these environments, designers must consider the level of control and feedback given to users in order to deliver a coherent design experience. At the same time designers must also accept that absolute control over typographic form is no longer possible, and they should design for multiple rather than single user experiences. Kyffin describes this shift from form to experience building by implying that "we no longer design merely *stuff*"; instead we are increasingly proactive builders of our respective cultures".²⁹

29. Kyffin, S., "The question of design", in Aarts, E., Marzano, S., (eds), *The new everyday. Views on ambient intelligence*, Amsterdam, 2003, pp.250-255.

30. Lee, J.C., Forlizzi, J., Hudson, S.E., "The kinetic typography engine: An extensible system for animating expressive text", *Letters CHI*, 4, no.2, 2002, pp.81-90.
Ford, S., Forlizzi, J., Ishizaki, S., "Kinetic typography: Issues in time-based presentation of text", *CHI97: Conference on Human Factors in Computing Systems*, Los Angeles, April 18-23, NY, 1997, pp. 269-270.
Ishizaki, S., "On kinetic typography", *Statements, the newsletter for the American Center for Design*, 12, no.1, 1998, pp.7-9.

3. temporality

Typography in a time-based environment is generally used to communicate expressive content to the viewer. The ability to convey expressive content has made motion typography a popular technique in film and television title sequences, as well as in advertising. Lee et al highlights several areas where motion typography has been effective in transmitting emotional attachment to the message by reviewing previous work by Ford et al and Ishizaki.³⁰ They are:

- Expression of affective (emotional) content
- Creation of characters
- Capture or direction of attention

Emotion can be expressed through a number of techniques. For example, tone of voice features such as pitch, loudness and tempo can be expressed through typeface, size, weight or contrast selection. Additionally, temporal effects like timing, speed, duration and pacing can also be employed. Characters in a story can also be portrayed by assigning specific typographic visual, spatial and kinetic properties. Motion is a very powerful technique to capture or focus the attention of

the viewer. Here, Lee et al draw from perceptive and cognitive psychology to understand the timing and pace required for the comprehension of meaning.

Improvements in computing processing power have led to innovative exploration in interactive time-based environments. Projects utilizing temporality as their main feature include works such as Temporal Typography [Fig.15], investigating the "expressive power of time varying typographic form to convey emotion and tones of voice";³¹ the Kinetic Typography Engine, a software engine to facilitate time-based expressive content in typographic manipulation and Expressive Typography, a "high quality dynamic and responsive typography in the electronic environment".³² These examples reflect what Drucker describes as using the 'materiality' of text, where the morphology and choreography of the animated text is used to express or enhance the meaning of the text.³³

Additionally, the work of Wong and Small also explored the concept of three-dimensional typography applied in a four-dimensional space. Small's Talmud Project attempts to combine passages from the Torah, Talmud and in English by exploring "the simultaneous display of multiple related text" in a three-dimensional virtual space. [Fig.16]³⁴ Many of these experimentations on temporal typography originated from the MIT Media Laboratory's Visible Language Workshop (1974-1994), led by Muriel Cooper. This group pioneered the 'information landscape' by using the four-dimensional space as a platform for delivering functional and expressive texts.

31. Wong, Y.Y., "Temporal typography: Characterization of time-varying typographic forms", MA Thesis, Massachusetts Institute of Technology, 1995.

32. Lee, "The kinetic typography engine". Small, D., "Expressive typography: High quality dynamic and responsive typography in the electronic environment", MA Thesis, Massachusetts Institute of Technology, 1987.

33. Drucker, J., *The visible word: Experimental typography and modern art, 1909-1923*, Chicago, 1994.

34. Small, D., *Talmud project*, Interactive display, NY, 2000.



4. usability

The traditional typographic issue of functionality (especially legibility and readability issues) has always been a major concern for designers. However, the introduction of digital media has introduced a new set of issues to address. Differences in screen display (for example quality, surface, size, ratio, refresh rate, orientation), rendering technology and

Figure 15. Screen shot of the Temporal Typography Project.

Figure 16. Screen shot of the Talmud Project.

35. In 1999, the Web Accessibility Initiative (WAI), part of the World Wide Web Consortium (W3C), published the Web Content Accessibility Guidelines (WCAG1). These are detailed and definitive guidelines on how to create accessible websites.

default system fonts have made type functionality a key consideration of digital design. Additionally, the specific terminology selected for the interface need to be considered in terms of relevance, suitability and clarity.

Usability can be discussed in two ways. Usability is a general term used to describe the ease at which a user can use a man-made object to perform a specific task. Its associated term –web accessibility–, relates specifically to online content and is used to describe the degree to which a web page is usable by as many people as possible (especially those with disabilities) without modification. Accessible websites have to adhere to specific guidelines set by the World Wide Web Consortium (W3C) and as a result, tended to be talked about as the more rigid aspect of usability.³⁵ Designers have to be aware of the importance of designing an accessible website, not only because it's responsible practice but also increasingly to comply with governmental laws and regulations. The driving principle of accessible design is the separation between structure and presentation. For example, type headings should be composed of type rather than an image to enable screen readers to access the information. Headings, lists, list items and text should be marked-up correctly using standard HTML tags to enable screen readers to convey the correct document structure to the user.

In contrast, usability is more often talked about as the 'human' aspect of design, evaluating the clarity of information in terms of how it's written and organised on the screen and the quality of interaction between the interface and user. Unlike accessibility, usability cannot be judged based on fixed guidelines but rather on how the overall design enables users to perform their task appropriately.

using the framework

Since its inception, this framework has been used in the planning, delivery and assessment of five different student projects. It is not the scope of this paper to describe the detail of these applications, however I will provide a brief summary of how the framework was used. The framework was used to introduce and encourage a broader understanding of typographic knowledge relevant to screen-based medium. Projects were developed with both a print and screen-based elements to enable multimedia and graphic design students to apply global typographic principles across both media, and at the same time further their understanding in screen-based principles.

At the preparation stage, the framework was used to plan the lecture-based material that will be delivered to the students. During the course of the project, the framework provided a structure in which the tutor and students discussed about their work, for e.g. the Typographic Functions categories (Form, Content, Expression and Context) were used in the discussion and analysis of the students' works. Additionally, these categories were used in the assessment of the student work by evaluating the final designed pieces against a set of design criteria from each category.

discussion, limitations and further developments

Although this study has only used and validated the framework as a single project delivery resource, discussions with educators have identified possible teaching and learning elements. As a teaching tool, the diagram [Fig.2] depicting the framework could be used to illustrate the relationship between global and specialist skills. It can help instil the idea of skills transferability in different contexts, and provide students with a relationship model between the different aspects of typographic usages. The Knowledge Matrix table [Fig.3] is useful as a reference tool for both the educator and the student. For educators, it can be used as a subject reference during the planning and delivery of type classes while students may want to use it as a subject reference or an aide-mémoire when revising their subject. This can be particularly useful for distance-learning students, who may not have the advantage of constant tutor contact to reinforce those principles.

In the final stage of the PhD study, the framework was peer reviewed by a total of 23 UK-based graphic designers and educators in three formal sessions. Reviewers interpreted the knowledge matrix as a comparator model to describe a design curriculum. Its categorization of knowledge seemed to echo a student's journey from novice to competent designer. Reviewers also discussed its potential use as a tool to enable discussion and planning of typography within a design curriculum. They also envisaged it as a useful visualization tool for a programme structure, whether it is presenting the programme to potential students or fellow academics. In addition, educators can use the Knowledge Matrix as a framework to assess the effectiveness and appropriateness of a student's typographic application.

It was apparent from the discussions with design educators that the teaching environments and pedagogic models of different universities vary greatly. They are dependent, amongst other things, on the teaching styles of the tutors, the educational profiles of the students and the institutional pedagogic approach. As mentioned earlier in this paper, a limitation of this framework is that the data used to develop and evaluate its applicability is sourced from a single teaching environment. Further research is required to understand how different design pedagogic models might affect its application and effectiveness. Additionally, as the framework was only tested over a short period of time, it is important to investigate the effectiveness of the framework through a longer period of use, where it can be integrated from the beginning to the end of a design programme.

It has become clear from the delivery of the early projects that students found it hard to engage with theories unless they are grounded in design examples and reinforced by vocabulary usage. Further work will be required to unpack the framework into smaller units of learning activities and tasks, which moves into the pedagogy of 'How' students learn (Kalantzis and Cope, 2006) from the 'What' they learn. It is also important to constantly review the relevancy of the specialist skills against changing media technology, socio and economic factors.

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